

Amendments to the Claims

Please amend claim 8 and add new claim 9 as indicated below:

1. (Previously amended) A digitally-integrating image sensor, comprising:

a semiconductor substrate;

a CMOS image sensor, formed on said semiconductor substrate, which produces image output information which, when sampled, indicates a value of a number of photons of an imaged scene which have impinged thereon; and

a digital memory, also formed on said semiconductor substrate, and connected to receive outputs from said CMOS image sensor, and to digitally integrate output values from said CMOS image sensor in the digital memory array.
2. (Original) A sensor as in claim 1, further comprising an analog to digital converter, receiving the outputs from said CMOS image sensor, converting said outputs to a digital form, and wherein said digital memory receives said digital form outputs.
3. (Original) A sensor as in claim 2, wherein said analog to digital converter is an oversampling converter.
4. (Original) a sensor as in claim 2, wherein each pixel of said CMOS image sensor is sufficiently small that it lacks sufficient capacity to integrate incoming photons for a desired integration time.
5. (Original) A sensor as in claim 2, further comprising a fixed pattern noise reduction circuit, between said CMOS image sensor and said analog to digital converter.
6. (Previously amended) A digitally-integrating image sensor, comprising:

a semiconductor substrate;

a CMOS image sensor, formed on said semiconductor substrate, which produces image output information, each pixel of said CMOS image sensor is sufficiently small that it lacks sufficient capacity to integrate incoming photons for a desired integration time, said image output information indicating a value of a number of photons of an imaged scene which have impinged thereon;

a noise reduction circuit, formed on said semiconductor substrate, and reducing an amount of noise in said image output information to form noise-reduced image output information;

an analog to digital converter, formed on said semiconductor substrate, and operating to convert said noise-reduced image output information to digital form noise-reduced image output information at specified intervals, each said specified interval being shorter than said desired integration time; and

digital memory, also formed on said semiconductor substrate, and connected to receive said digital form noise-reduced image output information outputs from said CMOS image sensor, and to integrate said digital formed noise-reduced image output information from said CMOS image sensor in the digital memory array for a time equivalent to said desired integration time to output integrated digitally integrated image data.

7. (Original) A device as in claim 6, wherein said CMOS image sensor is an active pixel sensor.

8. (Currently amended) A method of acquiring an image, comprising:

forming a CMOS image sensor on a semiconductor substrate;

using said CMOS image sensor to image a scene and to produce image output information;

sampling each pixel of said CMOS image sensor at a time period less than a desired integration time for each frame of the image using an analog signal processor including

column analog double sampling circuitry and a preamplifier with adjustable gain;

converting each sampled pixel to digital; and

storing the digitally-converted pixels in a digital memory, and using said digital memory to digitally integrate said digital pixels for the desired integration time, to thereby output a digitally integrated image.

9. (New) A digitally-integrating image sensor, comprising:

a semiconductor substrate;

a CMOS image sensor formed on said semiconductor substrate, said CMOS image sensor adapted to produce image output information which, when sampled, indicates a value of a number of photons of an imaged scene which have impinged thereon;

an analog signal processor also formed on said semiconductor substrate including column analog double sampling circuitry and a preamplifier with adjustable gain, said analog signal processor coupled to said CMOS image sensor; and

a digital memory, also formed on said semiconductor substrate, said digital memory coupled to said analog signal processor and adapted to receive outputs from said analog signal processor, and to digitally integrate output values from said analog signal processor in the digital memory array.